

## THE GENOME OF THE SEA SQUIRT *CIONA* INTESTINALIS: THE SEEDS OF VERTEBRATE INNOVATION

The first chordates appeared over a half a billion years ago, providing the ancestral stock from which modern vertebrates emerged. To shed some light on the chordate origins, we have sequenced the genome of *Ciona intestinalis*, a sea squirt whose lineage split from that of vertebrates in the mid Cambrian. *Ciona* has long been a popular model system for the study of development, featuring world-wide and year-round availability, easily visualized cells and morphogenetic processes, simple methods for transient transgene expression, and a growing genomic infrastructure including extensive EST and cDNA collections. A comparison of the assembled *Ciona* genome sequence and gene complement with available invertebrate and vertebrate sequences provides insight into the origins and development of a chordate and vertebrate systems including the nervous systems, muscular, immune and endocrine systems, as well as the evolution of the chordate body plan. The *Ciona* genome provides a foundation for a genome-scale analyses of regulatory networks through chordate development.